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## Programmable Relay Board – 2 Channel



Here is a board based on the PIC microcontroller that allows you to program the on and off operation of two 10-amp rated on-board relays. The relays can be programmed to operate completely independent of each other and the program can last up to 6 minutes in length. The program, once entered, can be started by pressing a Play switch or connecting to a dry contact switch closure for remote triggering. Also, you can place the board in Loop Mode that will cause the program to repeat continuously.

### Details:

As mentioned above, this board is based on the PIC microcontroller that allows you to program the on and off operation of two 10-amp rated on-board relays. The relays can be programmed to operate completely independent of each other and programs can last up to 6 minutes in length. Other features include:

- A Loop feature that replays the program over and over
- Loop mode.
- Indicator lights showing which relay is being programmed.
- Relay actuates while program is being entered.
- Relays have indicator LEDs that show when relay is actuated.
- Ability to remotely trigger program
- Relays have normally open and normally closed contacts.
- Program remains in memory even with power removed.

### Operation:

There are 4 pushbuttons on the board that allow the programming and playback of the 2 relays (see diagram below). From left to right, they are Channel 1 Start / Stop Record, Channel 2 Start / Stop Record, Key, and Playback. To program the first relay, momentarily press the Channel 1 Record / Stop pushbutton. You will see a yellow LED light for that relay indicating that the program is being recorded. Press the Key pushbutton to actuate the relay. The relay on/off cycles that you program can be of any number and length up to the 6 minute program time. When pressing the Key pushbutton, you will see the red LED associated with the relay light up when the relay is actuated as well as hear the relay click. When you are done recording that channel, press the programming pushbutton for that relay again and the yellow LED for that relay will go out. If you exceed the 6 minute time period, the board will automatically terminate the program and turn off the yellow LED. To program the second relay, press the Channel 2 Start / Stop Record pushbutton. The second yellow LED will light indicating that the program is being recorded. This will also start the replay of the program sequence that was recorded for the first relay. This allows you to synchronize the second relay program to the first relay program.

When done programming the second relay, press the second programming button again and the 2<sup>nd</sup> yellow LED will go out indicating that the storage of the program has stopped. If the length of the second program is shorter than the length of the first program, then the first relay program will continue to play until it finishes. Once both programs have been stored, you can play everything back by pressing the Play pushbutton – a green Play LED will light while the program is playing. Alternatively, you can hook a dry contact closure to the terminal block located next to the Play pushbutton and every time it is activated, the board will play back the program. If you want to continuously loop the stored program, turn on the Loop Switch. In this mode, it will continually replay the program over and over until the Loop Switch or the power is turned off.

You can re-record a program on either channel by simply repeating the programming process for that channel – it will overwrite whatever was previously recorded on that channel. To completely erase a program for a channel, just press the programming pushbutton for that channel, let it record for a second or two (without pressing the Key pushbutton). Press the program button again to stop programming and the channel is now empty. Essentially, what you have done is record a 1-2 second program of nothing. This has no effect on the programs stored in the other channel.

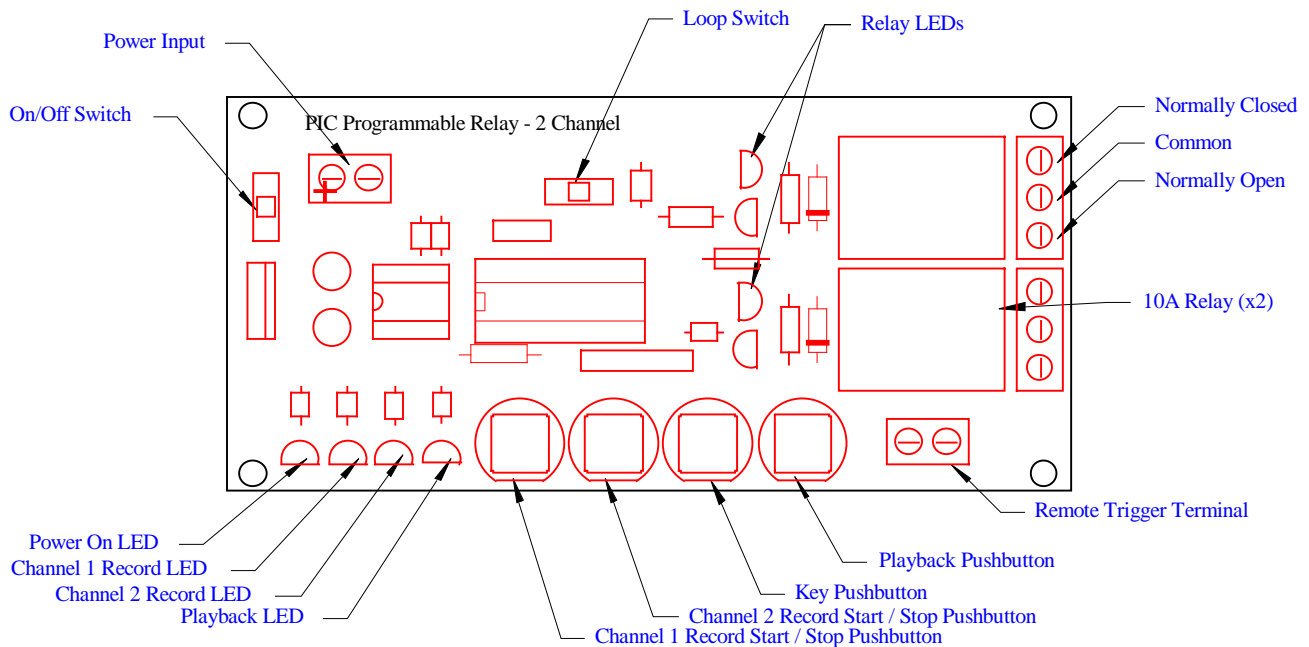
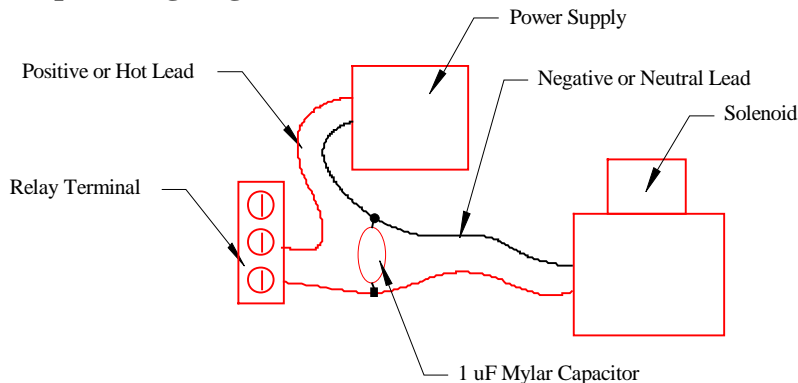
The board has a voltage regulator that allows you to power it with DC voltages of between 7.5 V and 24V.

If you are powering a device that draws a load of over 100 mA (like a solenoid), you should install a 1 uF Mylar capacitor (available from Radio Shack) as shown in the second diagram below. This absorbs the large power spike when the device is switched on and off. If you do not use this capacitor when powering large loads, your board might lock up when the program is started. If this happens, turn off the board and install the capacitor. I also build Noise Suppression Boards specifically for this purpose. They also provide fusing for your circuit. Please contact me for more information.

Here is an example of how this can be used. Channel one is programmed to actuate a pneumatic cylinder which raises a ghoulish head. Once the head is up, channel two can flash a light several times or actuate another device like a horn or you can use it to trigger my Digital Sound Recorder Board that will play back a loud monster's scream on a nearby speaker. If the ghoulish head is equipped with a servo to operate the mouth, attach my Sound to Servo Board to the Digital Sound Recorder Board and to the servo in the mouth and you now have quite a scary display – all from one trigger event!

**Board Layout:**

Below is a diagram showing component placement.

**Use of Capacitor when powering larger loads:****Specifications:**

- Input Power: 7.5 – 24 VDC
- Current Draw: 330 mA (while not powering any other devices)
- Board Dimensions: 2.1 x 4.5 inches

**Disclaimer:**

These boards are designed for educational use only. In no circumstances should these circuit boards be used in critical situations where failure could mean injury or property damage.

Please check out the other circuit board designs that I offer at [www.SimpleCircuitBoards.com](http://www.SimpleCircuitBoards.com). Here are just a few examples:

- Thermocouple Amplifiers
- 8-Bit Digital to Analog Converter
- TTL-Driven Relay Boards – 1 Amp and 10 Amp
- TTL-Driven Latching Relay Board

- Voltage Amplifier Board
- Water Level Monitors
- Water Level Control Boards
- Motor Control Boards
- Programmable Relays
- Programmable Servos

Check back often for new additions!

For more information, contact us at:

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